Modern Concrete Materials & Practices
Using the Benefits - Avoiding the Problems

A Two-Day Course which focuses on
"Lessons to be Learned, Risks to be Reduced & Liabilities to be Avoided"

Course Description
As a consultant specializing in concrete materials technology, the course presenter has investigated many projects where concrete failures, defects or deterioration were caused by incorrect practices and/or inappropriate selection of materials - particularly those developed using advances created by modern technology. Many of these experiences will be used during this two-day course to illustrate not only the benefits to be gained from recent advances in concrete technology but also the limitations of some concrete materials and construction practices.

Who Should Attend
The programme will be of special interest and a major benefit to all those involved in the design, specification, and construction of reinforced concrete structures, including Government Agencies, Specifiers, Architects, Engineers and Consultants, Inspectors and Technicians, as well as Contractors' Managers, Supervisors and Foremen. The programme will also be of interest to Materials Suppliers' Sales and Technical Personnel and Trainees.

Why You Should Attend
In today's business world, reducing risk and avoiding liability are key factors that should be of great concern to everyone. The topics covered within the programme have been designed to facilitate learning from the experiences of others - so that we can gain benefits from the use of modern advances in technology, while recognizing the cautions that we need to consider in order that we avoid potential problems that can sometimes arise.

Special Features
The programme will be presented using digital slide projection, mainly using case studies, as well as visual aids and samples.

Participants will be encouraged to ask questions, provide comments, and share their own experiences and problems.

A purpose-designed binder containing comprehensive information, photographs and technical data, will be provided to each participant, the cost of which is included in the registration fee.

PROGRAMME

DAY ONE

8.00 am Registration

8.30 am Welcome & Introduction

8.45 am **Modern Concrete - is it really more durable?**
An often asked question is "Why does today's concrete not perform as well as traditional concrete used to?" In this opening topic the evolution of concrete is reviewed, so that the many changes in materials and practices that have taken place can be reviewed to reveal the most likely answer to the question.

9.45 am **What is High Performance Concrete and can anyone produce or achieve it?**
Confusion often exists regarding the true meaning of High Performance Concrete and particularly regarding whether or not it can be satisfactorily produced using locally available materials and workers. In this topic, the technology is demystified, the benefits explained and the dangers highlighted.

10.00 am Coffee & Conversation

10.30 am **Why low water/cement ratio is not always appropriate for durability**
A low water cement ratio has almost always been considered a critical requirement for high strength and good durability - and usually this is true. However, this topic will explain why a low w/c ratio can sometimes be detrimental and why care is therefore required.

11.30 am **Why silica fume can be beneficial - but sometimes disastrous**
Silica fume has been used commercially for over a decade and its benefits are well known. This topic will highlight these benefits, but also explain some lesser known concerns that could cause failures if not well understood and considered during construction and repair.

12.30 pm Lunch on your own

1.30 pm **How important is curing and how does it affect durability?**
Curing is arguably the single most influential practice that affects the achievement of durable concrete, but usually it receives the least amount of attention. This topic reviews good and bad practices and uses examples to illustrate the effects that these can have on cracking, strength, surface toughness, etc.

2.30 pm **How clean should rebar be before concrete placement - are we missing the point?**
Although most specifications require reinforcement to be free of deleterious materials at the time of concrete placement, many experts claim that bond between concrete and steel is improved by some surface rust. This topic reviews whether this claim can be justified - but also introduces other concerns that are often over-looked and are arguably more important than bond of concrete to steel.

3.15 pm Coffee & Conversation

3.45 pm **Surface Scaling - the causes de-mystified and avoidance reviewed**
There are many similarities in appearance between the various forms of surface defects that can be described as "scaling" and confusion often prevents correct diagnosis and/or avoidance. In this topic, the various types are classified and the factors that cause them are identified in order that their occurrence - and the conflict that sometimes accompanies them - can be avoided.

4.30 pm Close of Day One

DAY TWO

8.15 am Arrival

8.30 am **Producing and testing air entrained concrete - avoiding conflict**
The benefits of air entrainment are well known and documented - but what effects do modern concrete materials have on the achievement of a satisfactory air void system? - and, are we adequately testing for it any way? This topic examines today's materials and practices and attempts to answer these questions using examples that suggest that this can be a controversial subject.

9.15 am **The epoxy coated rebar controversy explained**
When it was introduced in the late 1970's, the use of epoxy coated rebar was hailed as the most effective way to avoid corrosion problems. Today many authorities are exploring alternatives - but the reasons are not widely publicized. This topic explains their concerns and the associated problems.

10.00 am Coffee & Conversation

10.30 am **Below-slab moisture vapour barriers - are they necessary and how should they be installed?**
The use of moisture vapour barriers is often considered essential - particularly when under-slab moisture can affect the installation of coatings, floor coverings, etc. However, are they always necessary? This topic will be discussed, along with mistakes that are often made during their installation. Also reviewed, will be techniques that have been recommended to avoid the problems of shrinkage cracking and curling that can often result if not considered.

11.15 am **Fibre reinforcement - how real are the claims?**
A variety of claims are often made by proponents of fibre reinforcement for concrete and mortars - particularly that they permit the reduction or elimination of reinforcing steel, reduce or eliminate shrinkage, and/or permit reductions in concrete thickness. This topic reviews where some claims have proven to be accurate, while others have perhaps not been justified.

12.30 pm Lunch on your own

1.30 pm **Joints & joint sealants - why some work and some don't**
The successful construction of joints and the application of joint sealants rely heavily on the avoidance of poor practices and the correct selection of the sealant material. This topic reviews the major mistakes and mis-uses that have sometimes resulted in joint failures and/or early deterioration.

2.30 pm **Shake-on hardeners - learning from past mistakes**
There is no doubt that the use of shake-on surface hardeners most often improves the durability of concrete floor surfaces - particularly their wear and abrasion resistance. However, this topic will review specific case studies to illustrate how they can sometimes fail to perform well - and how inadequate application and materials can require expensive remedies.

3.30 pm **Interactive Workshop Session**
The course concludes with a session which provides for the exchange and sharing of views, opinions and experiences by participants.

4.30 pm Close of Course

(**Special Note:** Although the programme lists specific times for each topic, actual times may vary depending on the level of interest and the amount of time required for discussion and questions. Participants should therefore be prepared for departure after the 4.30 pm closure times.)

Course Presenter

Paul Jeffs; PJ Materials Consultants Limited

Paul Jeffs is an independent consultant who for the last 14 years has specialized in providing technical advice and services for the design, construction, restoration and protection of concrete and masonry structures. Prior to forming PJ Materials Consultants, based in Guelph, Ontario, he was employed for over 25 years within the construction industry around the world. For the last eighteen years of this time he was employed by a multi-national group headquartered in the United Kingdom. In 1976 he transferred from England to the Middle East, living for three years in Bahrain and Iran. During this time he was involved in many construction projects throughout the Arabian Gulf, including Saudi Arabia, Kuwait, United Arab Emirates and Qatar. In 1979 he moved to Japan and established a regional base from where he became involved in projects throughout South East Asia, including the Philippines, the Republic of Korea, Hong Kong, Taiwan, Indonesia, Singapore and Malaysia. Prior to emigrating to Canada in 1982, he was involved in construction projects in South Africa and India.

Paul Jeffs has served on the Canadian Standards Association Technical Committee (Associate) and the Moisture Protection and High Performance Concrete Sub-Committees for New Parking Structures (CAN/CSA S-413), as well as the now defunct CSA-266 series of Admixture standards, and is a past director of the Concrete Restoration Association of Ontario. He served as a member of the Technical Advisory Committee to the Ontario Ministry of Housing for the deterioration and repair of existing parking structures and was a member of the Ontario Ministry of Transportation technical advisory committee for the development of restoration standards. A member of the American Concrete Institute, Paul has been a guest lecturer for several Canadian universities, a speaker at many conferences, the author or co-author of numerous technical articles and is a regular presenter at seminars in the Middle East.